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Method for Designing New Technical Systems Based on a Transparent Morphological Cube with the Use of the Tree-Like Classifications

Method Description

With the help of method described, it is possible to develop essential new robots and technical systems. The paper introduces the description of the synthesis process for new mobile robots and their development.

The developed method is based on the morphological box of Zwicky. The multivariate interactive matrix is used for the design and the development of mobile robots and similar objects [1,2]. The choice of coordinate axes of a morphological box is the most important and comprehensive part of the work. Our program allows speeding up this procedure.

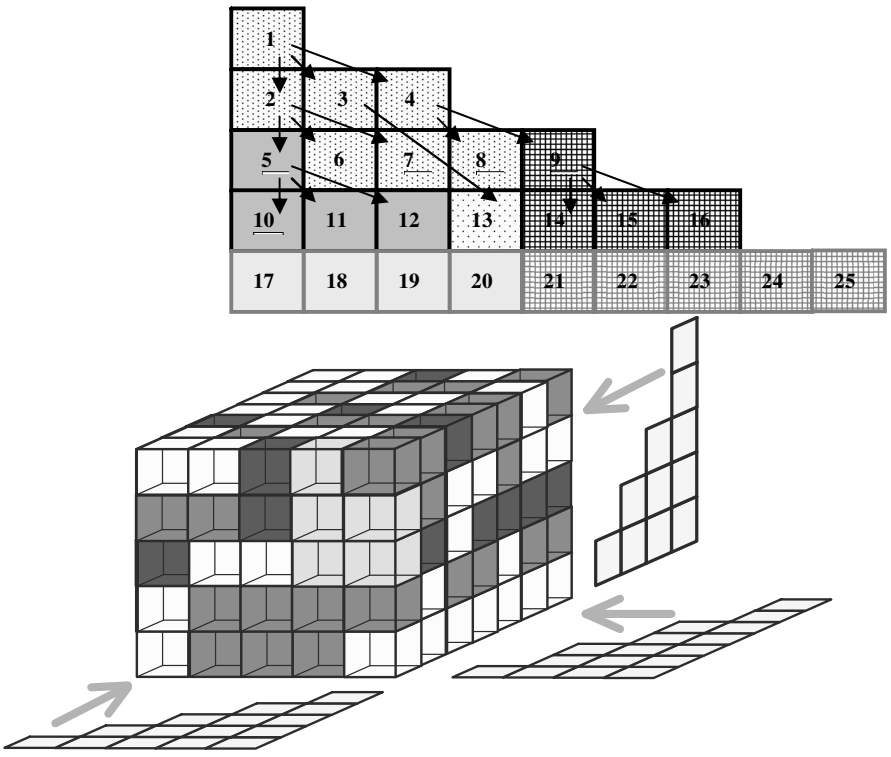

Fig. 1 The tree-like classification located in triangular tables
and used for generating three-dimensional morphological cube

For the synthesis of a new cube, it is possible to choose the tree-like classification in special triangular tables (Fig. 1). After choosing them he receives some new morphological boxes with various combinations of parameters.

These classifications are inserted into special triangular tables located in a three-dimensional space and each of them has only one degree of freedom. By moving these tables along each of axes of 3D cube, our program generates a new morphological cube. An engineer-developer has an opportunity to receive a transparent morphological cube for his specific purposes. The further work with a cube goes on by known algorithm.

Summary

Using our interactive software for the improvement of "man-computer" dialogue opens new opportunities for engineers. It is proposed to visualize a selection process of properties and parameters of the robots on a computer screen. The subject of work is the development of new functional principles for robots and similar technical systems with the use of a tree-like classifications and a transparent morphological Cube.

We used the tree-like classifications for automatic construction of various transparent morphological boxes on the screen of a computer. The special program allows choosing parameters of an object necessary for a specific target from several classifications and on their base to construct a multivariate matrix with various combinations of parameters. Thus we can automate the necessary process of creation of the Transparent Morphological Cube corresponding to the requirements of a specific target.

References:

[1] V. Lysenko, K. Zimmermann: Morphological method based on OLAP technology for designing new biosimilar robots with the use of the biological objects as prototypes. . 50. Internationales Wissenschaftliches Kolloquium. 2005. TU Ilmenau.

[2] V. Lysenko, K. Zimmermann.: Entwurfsmethode fur die Entwicklung mobiler Roboter basierend auf einer interaktiven morphologischen Matrix . 49. Internationales Wissenschaftliches Kolloquium. 2004. TU Ilmenau.

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